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(12) **United States Patent**  
**Mueller**

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(54) **COUPLING UNIT, COUPLING DEVICE,  
MOTOR VEHICLE AND METHOD**

(56) **References Cited**

U.S. PATENT DOCUMENTS

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3,853,336 A 12/1974 Shank  
4,191,384 A 3/1980 Svedberg  
4,362,323 A 12/1982 Lodder et al.

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(Continued)

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FOREIGN PATENT DOCUMENTS

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 154 days.

DE 10065225 A 7/2002  
DE 102007008066 A1 \* 8/2008 ..... F16L 13/142  
(Continued)

OTHER PUBLICATIONS

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German Search Report for corresponding Application No. 102013018344.8 (2014; 3 pages).\*

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(57) **ABSTRACT**

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**F16L 37/088** (2006.01)

**F16J 9/00** (2006.01)

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A coupling unit is disclosed which includes a sleeve opening that extends in the longitudinal direction and into which at least one medium-conveying plug element can be at least partially inserted. A support sleeve includes at least one circumferential pocket on an inner side that faces a plug element and defines the sleeve opening transverse to the longitudinal direction. A sliding element is arranged in the pocket and movably transferred from a release position into a coupling position during the insertion of the plug element. A sealing element is arranged between the sliding element and the pocket of the support sleeve in the release position and pre-stressed in the direction of the plug element. The sealing element is released by the sliding element in the coupling position in order to close and seal a potential gap formed between the support sleeve and the plug element.

(52) **U.S. Cl.**

CPC ..... **F16L 21/03** (2013.01); **F16D 25/00** (2013.01); **F16J 9/00** (2013.01); **F16L 37/088** (2013.01)

(58) **Field of Classification Search**

CPC .. **F16L 21/03**; **F16L 37/088**; **F16J 9/00**; **F16D 25/00**

See application file for complete search history.

**16 Claims, 3 Drawing Sheets**

